

## CHECKLIST OF THE FISHES OF THE CENTRAL AND NORTHERN APPALACHIAN MOUNTAINS

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**Abstract.**—A table lists 398 forms and 5 intergrade populations in 28 families in an area on the Atlantic slope from the Susquehanna River south to the PeeDee River, including Ohio River basin drainages from the Monongahela River in Pennsylvania to the Tennessee River in Alabama and Tennessee.

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The central Appalachians harbor a diverse fish fauna that includes numerous endemics. Jenkins, Lachner, and Schwartz (1972), as part of a zoogeographic analysis of this ichthyofauna, provided a table that lists the fishes of the central Appalachians by river drainage and general habitat. This table has been extremely valuable to ichthyologists, fisheries scientists, and environmental consultants throughout the past decade.

Numerous studies have substantially increased our knowledge of fish distribution throughout the central Appalachians (Hambrick *et al.* 1973, Hocutt and Hambrick 1973, Hocutt *et al.* 1973, Stauffer *et al.* 1975, Stauffer *et al.* 1976, Hocutt *et al.* 1978, Stauffer *et al.* 1978, Hendricks *et al.* 1979, Hocutt *et al.* 1979, Lee *et al.* 1980) and indicated that the original table should be updated. Moreover, it was thought that the addition of the Susquehanna, Licking, Green, and Kentucky rivers would enhance the usefulness of the faunal list.

The list (Table 1) includes 398 forms and 5 intergrade populations in 28 families. It covers an area on the Atlantic Slope from the Susquehanna River (New York and Pennsylvania) south to the PeeDee River (North Carolina and South Carolina). Ohio River basin drainages that are included extend from the Monongahela River in Pennsylvania south to the Tennessee River in Alabama and Tennessee.

It should be noted that the list is conservative. If a question exists as to the current or historic presence of a species, it is not included. No attempt is made to distinguish species that were historically present in the drainage from those that currently occur. Trinomials are used only when the distribution of subspecies could be accurately determined.

The authors appreciate the encouragement of Dr. E. Lachner, who recognized the need for a revision of the original faunal list.

Table 1.—Fishes of the central and northern Appalachian drainages and their general habitat. X = category most frequently inhabited. Drainage occurrence: E = endemic, N = native, NP = probably present-native, NI = regarded as native but possibly introduced, I = introduced, IP = probably or possibly introduced, Ma = euryhaline or diadromous. Native extralimital distribution: So = south on Atlantic slope, No = north on Atlantic slope, O = predominantly Ohio basin form, M = lower and/or central Mississippi basin, G = Gulf of Mexico slope.

Table 1.—Continued.

Table 1.—Continued.

Table 1.—Continued.

	Drainage occurrence											Native extralimital distribution		
	Ohio Basin													
	Monongahela	Little Kanawha	Kanawha: below falls	Kanawha: above falls	Guyandotte	Big Sandy	Licking	Kentucky	Green	Cumberland: below falls	Cumberland: above falls	Tennessee	Atlantic Slope	Elsewhere
<i>Oncorhynchus kisutch</i>													I	
<i>Oncorhynchus nerka</i>	I													
<i>Salmo gairdneri</i>	I	I	I	I	I	I	I	I	I	I	I	I	I	
<i>Salmo trutta</i>	I	I	I	I	I		I	I	I	I	I	I	I	
<i>Salvelinus fontinalis</i>	N	I	IP	N	N				IP	I	N	NoSo		
<i>Salvelinus namaycush</i>												No		
<b>OSMERIDAE</b>														
<i>Osmerus mordax</i>		I												
<b>UMBRIDAE</b>														
<i>Umbra limi</i>												N	M	
<i>Umbra pygmaea</i>												NoSo	G	
<b>ESOCIDAE</b>														
<i>Esox a. americanus</i>	I											NoSo	G	
<i>Esox a. vermiculatus</i>						N	N	N	N	N	N		GM	
<i>Esox lucius</i>	I					I	I	I	I	I	I	I	M	
<i>Esox masquinongy</i>	N	N	N	IP		I	N	N	N	N	N	N		
<i>Esox niger</i>	I		I	I					N		N	NoSo	GM	
<i>Esox reicherti</i>														
<b>CYPRINIDAE</b>														
<i>Campostoma a. anomalum</i>	N	N	N	N	N	N	N	N	N	N	N	NoSo	O	
<i>Campostoma oligolepis</i>													GM	
<i>Carassius auratus</i>	I		I			I	I	I	I	I	I			
<i>Clinostomus elongatus</i>	N				N	N						No	M	
<i>Clinostomus f. funduloides</i>	N			N	N			N			NI	So	O	
<i>Clinostomus f. estor</i>									N		N		So	
<i>Clinostomus f. subsp.</i>											N		No	
<i>Couesius plumbeus</i>														
<i>Ctenopharyngodon idella</i>	I	I	I	I	I	I	I	I	I	I	I			
<i>Cyprinus carpio</i>	I	I	I	I	I	I	I	I	I	I	I	No	GM	
<i>Ericymba buccata</i>	N	N	N	N	N	N	N	N	N	N	N		O	
<i>Exoglossum laurae</i>	NI		N										No	
<i>Exoglossum maxillingua</i>				NI										
<i>Hemitremia flammea</i>									N		N		G	
<i>Hybognathus hayi</i>									N		N		GM	
<i>Hybognathus n. nuchalis</i>						N			N		N		GM	
<i>Hybognathus n. regius</i>									N		N		NoSo	
<i>Hybopsis aestivalis hyostoma</i>			N		N	N	N	N	N	N	N		GM	
<i>Hybopsis amblops</i>	N	N	N			N	N	N	N	N	N		M	
<i>Hybopsis cahni</i>												E		
<i>Hybopsis d. dissimilis</i>	N	N	N	N		N		N	N	N	N		O	
<i>Hybopsis hypsinotus</i>												So		
<i>Hybopsis i. insignis</i>												E		
<i>Hybopsis i. eristigma</i>												E		
<i>Hybopsis labrosa</i>												So		
<i>Hybopsis monacha</i>												E		
<i>Hybopsis storeriana</i>	N	N	N			N	N	N	N	N	N		GM	
<i>Hybopsis x-punctata</i>												M		

Table 1.—Continued.

	Drainage occurrence															
	Atlantic Slope															
	Habitat						Drainage occurrence									
	Lowland	Upland	Montane	Big River	Stream	Creek	Pedee	Cape Fear	Neuse	Tar	Roanoke	James	York	Rappahannock	Potomac	Susquehanna
<i>Hybopsis</i> sp. cf. <i>zanema</i>	X			X			N	N								
<i>Leuciscus idus</i>															I	
<i>Nocomis biguttatus</i>		X			X	X										
<i>Nocomis effusus</i>		X			X	X										
<i>Nocomis l. leptocephalus</i>	X	X			X	X	N	N	N	N	N	N	IP	IP		
<i>Nocomis l. bellicus</i>	X				X	X										
<i>Nocomis l. interocularis</i>	X	X			X	X										
<i>Nocomis micropogon</i>	X	X	X	X							N	N	N	N	N	
<i>Nocomis platyrhynchus</i>	X	X	X	X							N	N	N	N	N	
<i>Nocomis raneyi</i>		X		X	X				N	N	N	N	NI			
<i>Notemigonus crysoleucas</i>	X	X			X	X	N	N	N	N	N	N	N	N	N	
<i>Notropis albeolus</i>		X			X	X	N	N	N	N	N	N				
<i>Notropis alborus</i>		X			X	X	N	N	N	N	N	N				
<i>Notropis altipinnis</i>	X	X				X	N	N	N	N	N	N				
<i>Notropis amnis</i>	X			X	X											
<i>Notropis amoenus</i>	X	X		X	X		NI	N	N	N	N	N	N	N	N	
<i>Notropis analostanus</i>		X			X		N	N	N	N	N	N	N	N	N	
<i>Notropis ardens</i>		X			X	X	IP	N	N	N	N	N		IP		
<i>Notropis ariommus</i>		X		X	X											
<i>Notropis atherinoides</i>	X	X		X	X											
<i>Notropis baileyi</i>		X				X										
<i>Notropis bellus</i>		X			X	X										
<i>Notropis bifrenatus</i>	X	X				X			N	NP	N	N	N	N	N	
<i>Notropis blennius</i>	X			X												
<i>Notropis boops</i>		X				X										
<i>Notropis buchanani</i>	X	X		X	X											
<i>Notropis camurus</i>	X	X		X	X											
<i>Notropis cerasinus</i>		X			X	X	IP				N	IP				
<i>Notropis chalybaeus</i>	X					X	N	N	N	N	N	N			N	
<i>Notropis chiliticus</i>		X			X	X	N									
<i>Notropis chryscephalus</i>	X	X			X	X										
<i>Notropis coccogenis</i>	X	X			X	X										
<i>Notropis cornutus</i>		X	X		X	X										
<i>Notropis c. cummingsae</i>	X				X		N	N	N	N						
<i>Notropis d. dorsalis</i>		X				X										
<i>Notropis emiliae</i>	X	X		X	X											
<i>Notropis fumeus</i>	X				X	X										
<i>Notropis galacturus</i>		X	X			X	X									
<i>Notropis heterodon</i>		X				X	X								N	
<i>Notropis heterolepis</i>		X				X	X								N	
<i>Notropis hudsonius</i>	X	X		X	X		N	N	N	N	N	N	N	N	N	
<i>Notropis leuciodus</i>		X	X			X	X									
<i>Notropis lirius</i>		X				X										
<i>Notropis lutipinnis</i>		X				X	X									
<i>Notropis lutrensis</i>	X	X		X	X	X							I			
<i>Notropis maculatus</i>	X				X	X	N	N								
<i>Notropis mekistocholas</i>	X				X	X	E									
<i>Notropis niveus</i>	X				X		N	N	N	N						
<i>Notropis petersoni</i>	X					X	N	N								

Table 1.—Continued.

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	Drainage occurrence															
	Atlantic Slope															
	Habitat															
	Lowland	Upland	Montane	Big River	Stream	Creek	Peegee	Cape Fear	Neuse	Tar	Roanoke	James	York	Rappahannock	Potomac	Susquehanna
<i>Notropis photogenis</i>		X		X	X											
<i>Notropis procne procne</i>	X	X			X	X						N	N	N	N	N
<i>Notropis p. longiceps</i>	X	X			X	X	N	N	N	N						
<i>Notropis pyrrhomelas</i>	X				X		N									
<i>Notropis rubellus</i>	X	X			X	X						N	N	N	N	N
<i>Notropis rubriroceus</i>			X		X	X										
<i>Notropis scabriceps</i>	X			X	X											
<i>Notropis scepticus</i>	X					X		N	N							
<i>Notropis semperasper</i>			X			X						E				
<i>Notropis shumardi</i>	X				X											
<i>Notropis spectrunculus</i>					X		X	X								
<i>Notropis spectrunculus</i> subsp.			X			X	X									
<i>Notropis spilopterus</i>				X	X	X						IP		N	N	
<i>Notropis stilbius</i>	X					X										
<i>Notropis stramineus stramineus</i>	X						X									
<i>Notropis telescopus</i>	X	X			X	X						I				
<i>Notropis umbratilus</i>				X	X		X	X								
<i>cyancephalus</i>																
<i>Notropis volucellus</i>	X				X	X			N	N	N	NI			IP	
<i>Notropis whipplei</i>	X				X	X										
<i>Notropis</i> sp. (paleband shiner)	X					X										
<i>Notropis</i> sp. (sawfin shiner)	X				X	X										
<i>Notropis</i> sp. ( <i>longirostris</i> group)	X						X	X								
<i>Phenacobius crassilabrum</i>			X			X										
<i>Phenacobius mirabilis</i>	X	X			X	X										
<i>Phenacobius teretulus</i>	X					X										
<i>Phenacobius uranops</i>	X				X	X										
<i>Phoxinus cumberlandensis</i>	X							X								
<i>Phoxinus eos</i>								X							N	
<i>Phoxinus erythrogaster</i>	X							X								
<i>Phoxinus o. oreas</i>	X	X					X	IP	N	N	N	N	IP	IP		
<i>Phoxinus o.</i> subsp.	X	X					X									
<i>Pimephales notatus</i>	X			X	X	X						IP	IP	IP	N	N
<i>Pimephales promelas</i>	X	X			X	X	I		I	I	I	I	I	I	I	
<i>Pimephales vigilax</i>	X	X		X	X											
<i>Rhinichthys atratulus</i>	X	X			X	X					N	N	N	N	N	
<i>Rhinichthys cataractae</i>	X	X			X	X					IP	N	N	N	N	
<i>Semotilus atromaculatus</i>	X	X			X	X	N	N	N	N	N	N	N	N	N	
<i>Semotilus corporalis</i>	X			X	X						N	N	N	N	N	
<i>Semotilus lumbee</i>								N	N							
<i>Semotilus margarita</i>	X	X				X									N	
<i>Tinca tinca</i>												I				
CATOSTOMIDAE																
<i>Carpio carpio</i>	X				X											
<i>Carpio cyprinus</i>	X	X			X			N		N	N		N	N		

Table 1.—Continued.

	Drainage occurrence													Native extralimital distribution	
	Ohio Basin														
	Monongahela	Little Kanawha	Kanawha: below falls	Kanawha: above falls	Guyandotte	Big Sandy	Licking	Kentucky	Green	Cumberland: below falls	Cumberland: above falls	Tennessee	Atlantic Slope	Elsewhere	
<i>Notropis photogenis</i>	N	N	N	N	N	N	N	N	N	N	N	N	N	O	
<i>Notropis procne procne</i>														No	
<i>Notropis p. longiceps</i>					IP									So	
<i>Notropis pyrrhomelas</i>														So	
<i>Notropis rubellus</i>	N	N	N	N	N	N	N	N	N	N	N	N	N	No	M
<i>Notropis rubricroceus</i>				IP										So	
<i>Notropis scabriceps</i>				E											
<i>Notropis scepticus</i>														So	
<i>Notropis semperasper</i>															
<i>Notropis shumardi</i>												N	NP	GM	
<i>Notropis spectrunculus</i>														E	
<i>Notropis spectrunculus</i> subsp.														E	
<i>Notropis spilopterus</i>	N	N	N	N	N	N	N	N	N	N	N	N	No	M	
<i>Notropis stilbius</i>	N	N	N	N	N	N	N	N	N	N	N	N	N	GM	
<i>Notropis stramineus stramineus</i>	N	N	N	IP	IP	N	N	N	N	N	N	N	N	M	
<i>Notropis telescopus</i>														M	
<i>Notropis umbratilus</i>															
<i>cyanopephalus</i>			N		N	N	N	N	N	N	N	N	N	M	
<i>Notropis volucellus</i>	N	N	N	N	N	N	N	N	N	N	N	N	N	GM	
<i>Notropis whipplei</i>	N	N	N	N	N	N	N	N	N	N	N	N	N	GM	
<i>Notropis</i> sp. (paleband shiner)															
<i>Notropis</i> sp. (sawfin shiner)															
<i>Notropis</i> sp. ( <i>longirostris</i> group)														N	M
<i>Phenacobius crassilabrum</i>														E	
<i>Phenacobius mirabilis</i>	N					N	N	N	N	N	N	N	N		GM
<i>Phenacobius teretulus</i>				E											
<i>Phenacobius uranops</i>															
<i>Phoxinus cumberlandensis</i>															
<i>Phoxinus eos</i>														No	M
<i>Phoxinus erythrogaster</i>					N	N	N	N	N	N	N	N	N		M
<i>Phoxinus o. oreas</i>					N								IP		
<i>Phoxinus o. subsp.</i>													E		
<i>Pimephales notatus</i>	N	N	N	N	N	N	N	N	N	N	N	N	No	GM	
<i>Pimephales promelas</i>	I	I	IP	I	N	N	N	N	N	N	N	NI	N	No	GM
<i>Pimephales vigilax</i>	N		N		N	N	N	N	N	N	N	N	N		GM
<i>Rhinichthys atratulus</i>	N		N	N	N	N	N	N	N	N	N	N	No	So	M
<i>Rhinichthys cataractae</i>	N		N	N	N	N	N	N	N	N	N	N	N	No	O
<i>Semotilus atromaculatus</i>	N	N	N	N	N	N	N	N	N	N	N	N	No	So	GM
<i>Semotilus corporalis</i>													No		
<i>Semotilus lumbee</i>															
<i>Semotilus margarita</i>				N									No	M	
<i>Tinca tinca</i>															
<b>CATOSTOMIDAE</b>															
<i>Carpio carpio</i>	N	N	N			N	N	N	N	N	N	N	N	GM	
<i>Carpio cyprinus</i>	N	N	N			N	N	N	N	N	N	N	No	So	GM

Table 1.—Continued.

Table 1.—Continued.

	Drainage occurrence												Native extralimital distribution	
	Ohio Basin													
	Monongahela	Little Kanawha	Kanawha: above falls	Kanawha: below falls	Guyandotte	Big Sandy	Licking	Kentucky	Green	Cumberland: below falls	Cumberland: above falls	Tennessee	Atlantic Slope	Elsewhere
<i>Carpioles velifer</i>	N	N	N	N	N	N	N	N	N	N	N	N	So	GM
<i>Catostomus catostomus</i>	N											No	GM	
<i>Catostomus commersoni</i>	N	N	N	N	N	N	N	N	N	N	N	NoSo	M	
<i>Cycleptus elongatus</i>	NP	NP	NP		NP	N	NP	N	N	N	N		GM	
<i>Erimyzon o. oblongus</i>												NoSo		
<i>Erimyzon o. claviformis</i>									N	N	N		GM	
<i>Erimyzon suetta</i>									N		N	So	GM	
<i>Hypentelium etowanum</i>											NI		G	
<i>Hypentelium nigricans</i>	N	N	N	N	N	N	N	N	N	N	N	NoSo	GM	
<i>Hypentelium roanokense</i>														
<i>Ictiobus bubalus</i>	N	N		N	N	N	N	N	N	N	N		GM	
<i>Ictiobus cyprinellus</i>					N	N	N	N	N	N	N		GM	
<i>Ictiobus niger</i>			N			NP	NP	N	N	N	N		GM	
<i>Lagochila lacera</i>							N	NP	N	N	N		M	
<i>Minytrema melanops</i>	N	N	N		N	N	N	N	N	N	N	So	GM	
<i>Moxostoma anisurum</i>	N	NP	N		N	N	N	N	N	N	N	So	M	
<i>Moxostoma ariommum</i>														
<i>Moxostoma atripinne</i>									E					
<i>Moxostoma carinatum</i>	N	N	N		N	N	N	N	N	N	N		GM	
<i>Moxostoma cervinum</i>														
<i>Moxostoma duquesnei</i>	N	N	N		IP	N	N	N	N	N	N		GM	
<i>Moxostoma erythrurum</i>	N	N	N	IP	N	N	N	N	N	N	N		GM	
<i>Moxostoma hamiltoni</i>														
<i>Moxostoma m. macrolepidotum</i>												NoSo	M	
<i>Moxostoma m. breviceps</i>	N	N	N		N	N	N	N	N	N	N		O	
<i>Moxostoma pappilosum</i>												So		
<i>Moxostoma rhothoecum</i>												So		
<i>Moxostoma robustum</i>												So		
<i>Moxostoma rupiscartes</i>												So	G	
<b>ICTALURIDAE</b>														
<i>Ictalurus brunneus</i>												So	G	
<i>Ictalurus catus</i>												NoSo	G	
<i>Ictalurus furcatus</i>	N	N					N	N	N	N	N		GM	
<i>Ictalurus melas</i>	N	N		IP		N	N	N	N	N	N		GM	
<i>Ictalurus natalis</i>	N	N	N	NI	N	N	N	N	N	N	N	NoSo	GM	
<i>Ictalurus nebulosus</i>	N	N	NI			N	N	N	N	IP	N	NoSo	GM	
<i>Ictalurus platycephalus</i>												So		
<i>Ictalurus punctatus</i>	N	N	N	NI	N	N	N	N	N	N	N	So	GM	
<i>Noturus baileyi</i>												E		
<i>Noturus elegans</i>									N		N		O	
<i>Noturus eleutherus</i>							N	N	N	N	N		M	
<i>Noturus exilis</i>								N	N	N	N		M	
<i>Noturus flavipinnis</i>									N		E			
<i>Noturus flavus</i>	N	N		NI	N	N	N	N	N	N	N		M	
<i>Noturus furiosus</i>														
<i>Noturus gilberti</i>														
<i>Noturus gyrinus</i>									N	N	N			
<i>Noturus insignis</i>				IP		N						IP	NoSo	GM
<i>Noturus leptacanthus</i>												NI	So	G

Table 1.—Continued.

	Habitat										Drainage occurrence					
	Lowland	Upland	Montane	Big River	Stream	Creek	Peedee	Cape Fear	Neuse	Tar	Roanoke	James	York	Rappahannock	Potomac	Susquehanna
<i>Noturus miurus</i>		X			X											
<i>Noturus nocturnus</i>		X		X	X											
<i>Noturus stigmosus</i>	X	X			X											
<i>Noturus stanauli</i>		X		X	X											
<i>Noturus</i> sp. cf. <i>leptacanthus</i>	X				X		N	N								
<i>Pylodictis olivaris</i>	X	X		X	X	I	I			I						
<b>AMBLYOPSIDAE</b>																
<i>Amblyopsis spelaea</i>																
<i>Chologaster agassizi</i>	X	X				X										
<i>Chologaster cornuta</i>	X				X	X	N	N	N	N	N					
<i>Typhlichthys subterraneus</i>			X													
<b>APHREDOODERIDAE</b>																
<i>Aphredoderus sayanus</i>	X	X			X	X	N	N	N	N	N	N	N	N	N	N
<b>PERCOPSIDAE</b>																
<i>Percopsis omiscomaycus</i>	X		X	X										N	N	
<b>GADIDAE</b>																
<i>Lota lota</i>															NI	
<b>CYPRINODONTIDAE</b>																
<i>Fundulus albolineatus</i>		X			X											
<i>Fundulus catenatus</i>		X			X	X										
<i>Fundulus d. diaphanus</i>	X	X			X			Ma	Ma	Ma	Ma	Ma	Ma	Ma	Ma	Ma
<i>Fundulus heteroclitus</i>	X							Ma	Ma	Ma	Ma	Ma	Ma	Ma	Ma	Ma
<i>Fundulus lineolatus</i>	X				X	X	N	N	N	N	N					
<i>Fundulus notatus</i>	X	X			X											
<i>Fundulus olivaceus</i>		X			X											
<i>Fundulus rathbuni</i>	X				X	X	N	N	N			N				
<i>Fundulus stellifer</i>		X			X	X										
<i>Fundulus waccamensis</i>	X						N					NP				
<i>Fundulus</i> sp.		X				X										
<b>POECILIIDAE</b>																
<i>Gambusia a. affinis</i>	X	X			X	X										
<i>Gambusia a. holbrookii</i>	X	X			X	X	Ma	Ma	Ma	Ma	Ma	Ma	Ma	Ma	Ma	Ma
<i>Heterandria formosa</i>	X						X	NP	N							
<b>ATHERINIDAE</b>																
<i>Labidesthes sicculus</i>		X				X									I	
<i>Menidia extensa</i>	X							E								
<b>GASTEROSTEIDAE</b>																
<i>Apeltes quadratus</i>												Ma	Ma	Ma	IP	
<i>Culaea inconstans</i>															IP	
<b>COTTIDAE</b>																
<i>Cottus baileyi</i>	X	X			X	X										
<i>Cottus b. bairdi</i>	X	X			X	X						N	N	N	N	N

Table 1.—Continued.

	Drainage occurrence												Native extrazonal distribution	
	Ohio Basin													
	Monongahela	Little Kanawha	Kanawha: below falls	Kanawha: above falls	Guyandotte	Big Sandy	Licking	Kentucky	Green	Cumberland: below falls	Cumberland: above falls	Tennessee	Atlantic Slope	Elsewhere
<i>Noturus miurus</i>	N	N	N	N	N	N	N	N	N	N	N	N	GM	
<i>Noturus nocturnus</i>					N	N	N	N	N	N	N	N	GM	
<i>Noturus stigmosus</i>		N			N	N	N	N	N				M	
<i>Noturus stanauli</i>													E	
<i>Noturus</i> sp. cf. <i>leptacanthus</i>														
<i>Pylodictis olivaris</i>	N	N	N	N	N	N	N	N	N	N	N	N	GM	
<b>AMBLYOPSIDAE</b>														
<i>Amblyopsis spelaea</i>									N				O	
<i>Chologaster agassizi</i>									N	N			M	
<i>Chologaster cornuta</i>											N		So	
<i>Typhlichthys subterraneus</i>									N	N	N		GM	
<b>APHREDODERIDAE</b>														
<i>Aphredoderus sayanus</i>									N	N		N	NoSo	GM
<b>PERCOPSIDAE</b>														
<i>Percopsis omiscomaycus</i>	N	N	N		N	N	N		N			No	M	
<b>GADIDAE</b>														
<i>Lota lota</i>								NI	NI				No	M
<b>CYPRINODONTIDAE</b>														
<i>Fundulus albolineatus</i>												E		
<i>Fundulus catenatus</i>										N	N	N		M
<i>Fundulus d. diaphanus</i>	I												No	
<i>Fundulus heteroclitus</i>														
<i>Fundulus lineolatus</i>												So	G	
<i>Fundulus notatus</i>							N	N	N	N	N	N	GM	
<i>Fundulus olivaceus</i>									N	N	N	N	GM	
<i>Fundulus rathbuni</i>												So		
<i>Fundulusstellifer</i>												IP		G
<i>Fundulus waccamensis</i>														
<i>Fundulus</i> sp.									N	N				
<b>POECILIIDAE</b>														
<i>Gambusia a. affinis</i>							IP	IP	Ma	Ma	IP	Ma	GM	
<i>Gambusia a. holbrookii</i>											NoSo	G		
<i>Heterandria formosa</i>											So	G		
<b>ATHERINIDAE</b>														
<i>Labidesthes sicculus</i>	N	N	N	I	N	N	N	N	N	N	N	N	So	GM
<i>Menidia extensa</i>														
<b>GASTEROSTEIDAE</b>														
<i>Apeltes quadratus</i>												I		
<i>Culaea inconstans</i>														
<b>COTTIDAE</b>														
<i>Cottus baileyi</i>	N	N	N	N	N	N	N	N	N	N	N	E		
<i>Cottus b. bairdi</i>											N	No	M	

Table 1.—Continued.

	Drainage occurrence											
	Atlantic Slope											
	Habitat						Drainage occurrence					
	Lowland	Upland	Montane	Big River	Stream	Creek	Peedee	Cape Fear	Neuse	Tar	Roanoke	James
<i>Cottus bairdi</i> subsp.	X			X	X							
<i>Cottus c. carolinae</i>	X			X	X							
<i>Cottus carolinae</i> subsp.	X			X	X							
<i>Cottus cognatus</i>	X			X	X							N
<i>Cottus girardi</i>	X	X		X	X							N N
<i>Cottus</i> sp. (smoky sculpin)			X	X	X							
<i>Cottus</i> sp.												E
PERCICHTHYIDAE												
<i>Morone americana</i>	X			X	X		Ma	Ma	Ma	Ma	Ma	Ma
<i>Morone chrysops</i>	X	X		X	X		I			I		I
<i>Morone mississippiensis</i>	X			X								
<i>Morone saxatilis</i>	X			X	X		Ma	Ma	Ma	Ma	Ma	Ma
CENTRARCHIDAE												
<i>Acantharcus pomotis</i>	X			X	X	N	N	N	N	N	N	N
<i>Ambloplites cavifrons</i>	X			X				N	N	N		
<i>Ambloplites r. rupestris</i>	X	X	X	X		IP				I	IP	I I I
<i>Centrarchus macropterus</i>	X			X		N	N	N	N	N	N	NI NI
<i>Elassoma evergladei</i>	X			X		N	N					
<i>Elassoma zonatum</i>	X			X		N	N	N	N			
<i>Elassoma</i> sp.	X				X							
<i>Elassoma</i> sp.	X			X	E							
<i>Enneacanthus chaetodon</i>	X			X		N	N	N	N	N	N	N
<i>Enneacanthus gloriosus</i>	X			X		N	N	N	N	N	N	N
<i>Enneacanthus obesus</i>	X			X		N	N	N	N	N	N	NP N
<i>Lepomis auritus</i>	X			X	X	N	N	N	N	N	N	N
<i>Lepomis cyanellus</i>	X			X		I	I	I	I	I	I	I
<i>Lepomis gibbosus</i>	X			X	X	N	N	N	N	N	N	N
<i>Lepomis gulosus</i>	X	X	X	X		N	N	N	N	N	N	IP N
<i>Lepomis humilis</i>	X	X		X	X							
<i>Lepomis macrochirus</i>	X	X		X	X	NI	NI	IP	IP	IP	IP	IP
<i>Lepomis marginatus</i>	X			X		N	N	N	N			
<i>Lepomis megalotis</i>	X			X	X	NI	NI	IP	IP			I
<i>Lepomis microlophus</i>	X	X		X		NI	NI	IP	IP			I I
<i>Lepomis punctatus</i>	X			X		N	N	N				
<i>Micropterus coosae</i>												
<i>Micropterus d. dolomieu</i>	X			X	X	I		I		I	I	I
<i>Micropterus p. punctulatus</i>	X	X		X	X							
<i>Micropterus s. salmoides</i>	X	X		X	X	N	N	N	N	IP	IP	IP
<i>Pomoxis annularis</i>	X	X		X	X	I	I	I		I	I	I
<i>Pomoxis nigromaculatus</i>	X	X		X	X	N	N	N	N	IP	IP	IP
PERCIDAE												
<i>Ammocrypta asprella</i>	X			X	X							
<i>Ammocrypta clara</i>	X			X	X							
<i>Ammocrypta pellucida</i>	X			X	X							
<i>Ammocrypta vivax</i>	X	X		X	X							
<i>Etheostoma acuticeps</i>	X	X		X	X							
<i>Etheostoma asprigene</i>	X				X							

Table 1.—Continued.

	Drainage occurrence												Native extrazonal distribution	
	Ohio Basin													
	Monongahela	Little Kanawha	Kanawha: below falls	Kanawha: above falls	Guyandotte	Big Sandy	Licking	Kentucky	Green	Cumberland: below falls	Cumberland: above falls	Tennessee		
<i>Cottus bairdi</i> subsp.		N										N		
<i>Cottus c. carolinae</i>												N	M	
<i>Cottus carolinae</i> subsp.		N										N		
<i>Cottus cognatus</i>													No	
<i>Cottus girardi</i>														
<i>Cottus</i> sp. (smoky sculpin)												N	So	
<i>Cottus</i> sp.														
<b>PERCICHTHYIDAE</b>														
<i>Morone americana</i>	I	NI	NI	IP		NI	NP	N	N	N	N	N	NoSo	
<i>Morone chrysops</i>													GM	
<i>Morone mississippiensis</i>													GM	
<i>Morone saxatilis</i>		I		I		I	I	I	I	I	I	NoSo	G	
<b>CENTRARCHIDAE</b>														
<i>Acantharcus pomotis</i>													NoSo G	
<i>Ambloplites cavifrons</i>														
<i>Ambloplites r. rupestris</i>	N	N	N	IP	N	N	N	N	N	N	N	N	No M	
<i>Centrarchus macropterus</i>													So M	
<i>Elassoma evergladei</i>													So	
<i>Elassoma zonatum</i>													So GM	
<i>Elassoma</i> sp.												E		
<i>Enneacanthus chaetodon</i>													NoSo	
<i>Enneacanthus gloriosus</i>													NoSo G	
<i>Enneacanthus obesus</i>													NoSo	
<i>Lepomis auritus</i>				IP			I	I	I	I	I	NoSo	G	
<i>Lepomis cyanellus</i>	N	N	N	IP	N	N	N	N	N	N	N		GM	
<i>Lepomis gibbosus</i>	NI		N	IP			IP		IP	IP	IP	NoSo	M	
<i>Lepomis gulosus</i>			N	IP			N	N	N	IP	N	So	GM	
<i>Lepomis humilis</i>				IP			N	N	N	N	N		GM	
<i>Lepomis macrochirus</i>	N	N	N	IP	N	N	N	N	N	N	N	So	GM	
<i>Lepomis marginatus</i>													GM	
<i>Lepomis megalotis</i>	N	N	N	I	N	N	N	N	N	N	N		GM	
<i>Lepomis microlophus</i>	IP				IP	IP	IP	N	N	N	N	So	GM	
<i>Lepomis punctatus</i>								N		N	N	So	GM	
<i>Micropterus coosae</i>										I			G	
<i>Micropterus d. dolomieu</i>	N	N	N	IP	N	N	N	N	N	N	N		M	
<i>Micropterus p. punctulatus</i>	N	N	N	NI	N	N	N	N	N	N	N		M	
<i>Micropterus s. salmoides</i>	N	N	N	IP	N	N	N	N	N	N	NI	N	GM	
<i>Pomoxis annularis</i>	N	N	N	IP	N	N	N	N	N	N	NI	N	GM	
<i>Pomoxis nigromaculatus</i>	N	N	N	IP	N	N	N	N	N	N	N	So	GM	
<b>PERCIDAE</b>														
<i>Ammocrypta asprella</i>									N	N			GM	
<i>Ammocrypta clara</i>									N	N			GM	
<i>Ammocrypta pellucida</i>	N	N	N		N	N	N	N	N	N			M	
<i>Ammocrypta vivax</i>													GM	
<i>Etheostoma acuticeps</i>												E		
<i>Etheostoma asprigene</i>									N	N		N	GM	

Table 1.—Continued.

	Drainage occurrence										
	Atlantic Slope										
	Habitat										
	Lowland	Upland	Montane	Big River	Stream	Creek	Peedee	Cape Fear	Neuse	Tar	Roanoke
											James
											York
											Rappahannock
											Potomac
											Susquehanna
<i>Etheostoma aquali</i>	X			X							
<i>Etheostoma atripinne</i>	X			X	X						
<i>Etheostoma barbouri</i>	X			X	X	X					
<i>Etheostoma bellum</i>	X		X	X	X	X					
<i>Etheostoma blennioides</i>											N N
<i>blennioides</i>	X	X		X	X						
<i>Etheostoma b. gutselli</i>		X		X	X	X					
<i>Etheostoma b. newmani</i>	X	X		X	X						
<i>Etheostoma b.: newmani</i> ×				X	X						
<i>blennioides</i>	X										
<i>Etheostoma b.: n. × gutselli</i>											
<i>Etheostoma blennius</i>	X			X	X						
<i>Etheostoma boschungi</i>	X					X					
<i>Etheostoma caeruleum</i>	X			X	X	X					NI
<i>Etheostoma camurum</i>	X		X	X							
<i>Etheostoma chlorobranchium</i>		X			X						
<i>Etheostoma chlorosomum</i>	X					X					
<i>Etheostoma cinereum</i>	X	X				X					
<i>Etheostoma collis collis</i>	X	X				X	N				
<i>Etheostoma c. lepidinum</i>	X	X				X	N	N			N
<i>Etheostoma duryi</i>	X			X	X						
<i>Etheostoma etnieri</i>	X			X	X						
<i>Etheostoma flabellare</i>	X	X		X	X	N	N	N	N	N	N N
<i>Etheostoma fusiforme fusiforme</i>	X			X	X	N	N	N	N	N	N
<i>Etheostoma f. barratti</i>	X			X	N						
<i>Etheostoma gracile</i>	X			X	X						
<i>Etheostoma histrio</i>	X	X		X							
<i>Etheostoma jessiae</i>		X		X							
<i>Etheostoma kanawhae</i>	X			X							
<i>Etheostoma kennicotti</i>	X			X	X						
<i>Etheostoma longimanum</i>	X	X		X	X						E
<i>Etheostoma luteovinctum</i>	X				X						
<i>Etheostoma m. maculatum</i>	X				X						
<i>Etheostoma m. sanguifluum</i>	X				X						
<i>Etheostoma m. vulneratum</i>	X	X	X		X						
<i>Etheostoma mariae</i>	X	X		X	X		E				
<i>Etheostoma meadiae</i>	X			X	X						
<i>Etheostoma microlepidum</i>	X			X							
<i>Etheostoma neopterum</i>	X	X			X						
<i>Etheostoma n. nigrum</i>	X			X	X			N	N	N	N
<i>Etheostoma n. susanae</i>	X				X						
<i>Etheostoma n.: nigrum</i> ×											
<i>susanae</i>	X			X	X						
<i>Etheostoma obeyense</i>	X			X	X						
<i>Etheostoma olivaceum</i>	X					X					
<i>Etheostoma o. olmstedi</i>	X	X		X	X			N	N	N	N
<i>Etheostoma o.: o. ×</i>											
<i>atromaculatum</i>											N
<i>Etheostoma o. atromaculatum</i>	X	X		X	X			N	N	N	N

Table 1.—Continued.

	Drainage occurrence										Native extralimital distribution	
	Ohio Basin											
	Monongahela	Little Kanawha	Kanawha: below falls	Kanawha: above falls	Guyandotte	Big Sandy	Licking	Kentucky	Green	Cumberland: below falls	Cumberland: above falls	Tennessee
<i>Etheostoma aquali</i>												E
<i>Etheostoma atripinne</i>										N		N
<i>Etheostoma barbouri</i>										E		
<i>Etheostoma bellum</i>										E		
<i>Etheostoma blennioides</i>												
<i>blennioides</i>	N	N	N	N	N	N	N	N	N			O
<i>Etheostoma b. gutselli</i>											E	
<i>Etheostoma b. newmani</i>										N	N	M
<i>Etheostoma b.: newmani</i> ×												
<i>blennioides</i>										N		
<i>Etheostoma b.: n. × gutselli</i>											E	
<i>Etheostoma blennius</i>										E		
<i>Etheostoma boschungi</i>										E		
<i>Etheostoma caeruleum</i>	N	N	N	N	N	N	N	N	N	N	N	M
<i>Etheostoma camurum</i>	N	N	N					N	N	N	N	O
<i>Etheostoma chlorobranchium</i>										E		
<i>Etheostoma chlorosomum</i>								N	N	N	N	GM
<i>Etheostoma cinereum</i>								N	N	N	N	
<i>Etheostoma collis collis</i>											So	
<i>Etheostoma c. lepidinum</i>												
<i>Etheostoma duryi</i>										E		
<i>Etheostoma etnieri</i>										E		
<i>Etheostoma flabellare</i>	N	N	N	N	N	N	N	N	N	N	NoSo	M
<i>Etheostoma fusiforme fusiforme</i>										No		
<i>Etheostoma f. barratti</i>										IP	So	GM
<i>Etheostoma gracile</i>								N	N	N	N	GM
<i>Etheostoma histrio</i>								N	N	N	N	GM
<i>Etheostoma jessiae</i>								N	N	N	N	
<i>Etheostoma kanawhae</i>				E								
<i>Etheostoma kennicotti</i>								N	N	N	N	O
<i>Etheostoma longimanum</i>												
<i>Etheostoma luteovinctum</i>								N	N	N	N	
<i>Etheostoma m. maculatum</i>			N				N	N				O
<i>Etheostoma m. sanguifluum</i>								E				
<i>Etheostoma m. vulneratum</i>										E		
<i>Etheostoma mariae</i>												
<i>Etheostoma meadiae</i>										N		
<i>Etheostoma microlepidum</i>										E		
<i>Etheostoma neopterum</i>										E		
<i>Etheostoma n. nigrum</i>	N	N	N	N	N	N	N	N	N	N	No	GM
<i>Etheostoma n. susanae</i>												
<i>Etheostoma n.: nigrum</i> ×										E		
<i>susanae</i>												
<i>Etheostoma obeyense</i>								N				
<i>Etheostoma olivaceum</i>										E		
<i>Etheostoma o. olmstedi</i>										E		
<i>Etheostoma o.: o.</i> ×										No		
<i>atromaculatum</i>												
<i>Etheostoma o. atromaculatum</i>										No		

Table 1.—Continued.

Table 1.—Continued.

	Drainage occurrence										Native extralimital distribution			
	Ohio Basin													
	Monongahela	Little Kanawha	Kanawha: below falls	Kanawha: above falls	Guyandotte	Big Sandy	Licking	Kentucky	Green	Cumberland: below falls	Cumberland: above falls	Tennessee	Atlantic Slope	Elsewhere
<i>Etheostoma o.: o. × vexillare</i>														
<i>Etheostoma o. vexillare</i>														So
<i>Etheostoma o. maculaticeps</i>														
<i>Etheostoma osburni</i>														
<i>Etheostoma parvipinne</i>														N
<i>Etheostoma perlóngum</i>														
<i>Etheostoma podostemone</i>														
<i>Etheostoma proeliare</i>														
<i>Etheostoma rufilineatum</i>														GM
<i>Etheostoma s. sagitta</i>														
<i>Etheostoma sagitta spilotum</i>														
<i>Etheostoma sellare</i>														
<i>Etheostoma serriferum</i>														So
<i>Etheostoma simoterum</i>	NI		NI											
<i>Etheostoma smithi</i>														
<i>Etheostoma s. spectabile</i>						N	N	N	N	N	N	N		M
<i>Etheostoma squamiceps</i>						N	N	N	N	N	N	N		O
<i>Etheostoma striatum</i>														
<i>Etheostoma stigmaeum</i>								N	N					GM
<i>Etheostoma swaini</i>								N	N					GM
<i>Etheostoma swannanoa</i>								N	N					
<i>Etheostoma tippecanoe</i>	N	N				N	N	N	N					O
<i>Etheostoma tuscumbia</i>														
<i>Etheostoma variatum</i>	N	N	N			N	N	N	N					O
<i>Etheostoma virgatum</i>											E			
<i>Etheostoma vitreum</i>														
<i>Etheostoma z. zonale</i>	N	N	N			N	N	N	N	N	N	N	No	M
<i>Etheostoma</i> sp. (duskytail darter)														
<i>Etheostoma</i> sp. (Elk darter)														
<i>Etheostoma</i> ( <i>Ulocentra</i> ) sp.														
A—emerald darter														
<i>Etheostoma</i> ( <i>Ulocentra</i> ) sp. B														G
<i>Etheostoma</i> ( <i>Ulocentra</i> ) sp. C														M
<i>Etheostoma</i> ( <i>Ulocentra</i> ) sp.														
D—golden snubnose darter														
<i>Etheostoma</i> ( <i>Ulocentra</i> ) sp.														
E—(Green River)											E			
<i>Etheostoma</i> ( <i>Ulocentra</i> ) sp.														
F—(Barren River) splendid darter											E			
<i>Perca flavescens</i>	NI		IP	IP						IP		IP	No	M
<i>Percina aurantiaca</i>											E			
<i>Percina burtoni</i>											N	N		
<i>Percina c. caprodes</i>	N	N	N	NI	N	N	N	N	N	N	N	N		M
<i>Percina c. semifasciata</i>													No	M
<i>Percina copelandi</i>						N	N	N	N	N	N	N		M
<i>Percina crassa</i>													So	
<i>Percina e. evides</i>						N	N	N	N	N	N	N		M
<i>Percina evides</i> subsp.											E			

Table 1.—Continued.

	Drainage occurrence															
	Atlantic Slope															
	Lowland	Upland	Montane	Big River	Stream	Creek	Peedee	Cape Fear	Neuse	Tar	Roanoke	James	York	Rappahannock	Potomac	Susquehanna
<i>Percina gymnocephala</i>		X	X		X											
<i>Percina macrocephala</i>		X		X	X											
<i>Percina maculata</i>		X		X	X											
<i>Percina n. notogramma</i>		X			X							N	N	N	N	
<i>Percina n. montuosa</i>		X			X							E				
<i>Percina ouachitae</i>	X	X		X	X											
<i>Percina oxyrhyncha</i>		X	X	X	X											
<i>Percina p. peltata</i>		X				X						N	N	N	N	N
<i>Percina p. nevisense</i>		X				X						N	N	N		
<i>Percina peltata</i> subsp.		X				X						E				
<i>Percina phoxocephala</i>		X				X										
<i>Percina rex</i>		X				X						E				
<i>Percina roanoka</i>		X				X						N	N	N	NI	
<i>Percina s. sciera</i>	X	X		X	X											
<i>Percina shumardi</i>	X	X		X												
<i>Percina squamata</i>		X	X		X											
<i>Percina tanasi</i>		X			X											
<i>Percina (Odontopholis) sp.</i>		X				X										
<i>Stizostedion canadense</i>	X	X		X												
<i>Stizostedion v. vitreum</i>		X		X	X		IP		NI		NI	NI		I	N	
SCIACENIDAE																
<i>Aplodinotus grunniens</i>		X	X		X											

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Table 1.—Continued.

	Drainage occurrence											Native extrazonal distribution	
	Ohio Basin												
	Monongahela	Little Kanawha	Kanawha: below falls	Kanawha: above falls	Guyandotte	Big Sandy	Licking	Kentucky	Green	Cumberland: below falls	Cumberland: above falls	Tennessee	
<i>Percina gymnocephala</i>				E									O
<i>Percina macrocephala</i>	N	N	N		N	NP	N	N	N	N	N	N	GM
<i>Percina maculata</i>	N	N	N		N	N	N	N	N	N	N	N	No
<i>Percina n. notogramma</i>													
<i>Percina n. montuosa</i>													
<i>Percina ouachitae</i>									N		N		GM
<i>Percina oxyrhyncha</i>	N	N	N	N	N	N	N	N					No
<i>Percina p. peltata</i>													
<i>Percina p. nevisense</i>													
<i>Percina peltata</i> subsp.													
<i>Percina phoxocephala</i>								N	N	N	N	N	M
<i>Percina rex</i>													
<i>Percina roanoka</i>				IP									
<i>Percina s. sciera</i>	N	N			N	N	NP	N	N	N	N	N	GM
<i>Percina shumardi</i>						N	N	N	N	N	N	N	GM
<i>Percina squamata</i>													
<i>Percina tanasi</i>													E
<i>Percina (Odontopholis) sp.</i>							N	N					
<i>Stizostedion canadense</i>	N		N		N	N	NP	N	N	N	N	N	GM
<i>Stizostedion v. vitreum</i>	N		N	NI	N	N	N	NP	N	N	N	N	GM
SCIAENIDAE													
<i>Aplochiton grunniens</i>	N	N	N		N	N	N	N	N	N	N	N	GM

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